DETERMINANT FACTORS OF EARLY CORONARY ATHEROSCLEROSIS AT DR. WAHIDIN SUDIROHUSODO HOSPITAL MAKASSAR, 2014

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ABSTRACT

Early age coronary atherosclerosis is the incidence of coronary atherosclerosis that occurs not in time or occur at a relatively young age ≤ 55 years. The aim of the study was to determine the risk factors of early coronary atherosclerosis at the Dr. Wahidin Sudirohusodo Hospital, Makassar. The study was observation using a case control study. The cases were patients with early coronary atherosclerosis with the age of ≤ 55 years, and the controls were non-early coronary atherosclerosis by matching the age group and gender. Results showed that the risk of occurrence of early coronary atherosclerosis is hypertension (OR = 2.19, 95% CI: 1.09 – 4.36) and a low HDL (OR = 5.08, 95% CI: 2.51 - 10.30), Non risk factors of early atherosclerosis is obesity and high total cholesterol and LDL. This study suggested that need to control blood pressure and HDL cholesterol within normal limits in order to control the disease risk factors that can prevent cardiovascular disease in the future.

Keywords: *early coronary atherosclerosis, obesity, hypertension, lipid,*

INTRODUCTION

Atherosclerosis is the term of process by which a substance or material deposition of fat, cholesterol, cell waste products, calcium, fibrin (clotting material in the blood) and substance / other materials forming the inner layer of the artery blood vessel. These layers are called plaque. Hardening of the arteries, often occurs with advancing age of a person (American Heart Association, 2012). Number of patients with atherosclerosis in the era of globalization and industrialization tends to increase. In the last decade of heart disease and blood vessels that constituted by atherosclerosis develop into a major killer in Indonesia and the world. Research shows, the main cause of death of the world's population is at the heart ie (42.9%), stroke (25.9%), pulmonary disease and asthma (12.5%), cancer (5.4%), and other diseases (less than four percent) (Hura, 2010).

Atherosclerosis occurs over many years, and can be started at the time of young individuals. According to the Centers Departments and Cardiovascular Diseases in Minnesota (2013), someone said to hit atherosclerosis early age if the patient has any manifestations of atherosclerosis, including heart attack, stroke and peripheral arterial disease at a relatively young age (under age 55 in men, under the age of 65 years in women). Lifestyle or certain medical conditions may lead to atherosclerosis occurs at an early age. Results of research conducted by Robinson (2009) the incidence of subclinical atherosclerosis dyslipidemia associated with the value (OR = 2.24), hypertension (OR = 1.74), and total cholesterol (OR = 2.2). Another study conducted Rozanski (2010) in New York, United States who were investigating the incident coronary arteries found that there are significant results between clinical variables including total

cholesterol, LDL, HDL, blood glucose levels on the incidence of coronary atherosclerosis. This study aims to determine the risk, obesity, hypertension and lipid levels consisting of total cholesterol, LDL and HDL on the incidence of coronary atherosclerosis in the hospital early age. Dr Wahidin Sudirohusodo hospital 2014.

MATERIALS AND METHODS

Research Site

The research was conducted in. Dr. Wahidin Sudirohusodo Hospital, Makassar considering the prevalence of cardiac patient visits continue to increase visits are 17.923 in 2006 to 25.490 in 2011. In addition, Dr. Wahidin Sudirohusodo hospital is one of the main referral hospital in East Indonesia and belong to the government.

Design and Research Variables

This observational analytic study applied case-control study design to see the magnitude of risk of the independent variables, namely obesity, hypertension and lipid levels consisting of total cholesterol, LDL and HDL, whereas on the dependent variable is the incidence of coronary atherosclerosis early age <55 years with a trace risk factors of the subject by comparing the case group and the control group.

Population and Sample

Samples were taken in two ways ie for cases using consecutive sampling technique and for the control group with accidental sampling technique. The population of this study is the general public as well as residents who use health care facilities in Poly Heart Hospital Dr. Wahidin Sudirohusodo. The sample in this study were divided into two patients who've been diagnosed with ACS (Acute Coronary Syndrome) or CAD (Coronary Artery Disease) <55 years at Poly Heart Hospital of Dr. Wahidin Sudirohusodo as case group and the healthy respondents < 55 years who never diagnosed heart disease and blood vessel as a comparison control group with 1 case: 1 control by matching the age groups and genders.

Data Collection

Primary data were obtained through direct data collection from a sample of respondents was selected as the case group and control through interviews using questionnaires, measurement of height, weight, blood pressure and blood sampling of respondents, for respondents lipid samples taking then examined in clinical laboratories Prodia, while secondary data obtained from the agency through patient chart / medical record that is in the heart clinic of Hospital of Dr. Wahidin Sudirohusodo.

Data Analysis

Data analysis was performed using univariate to get an overview of the general characteristics of the frequency distribution of the respondents as well as the dependent variable. Bivariate analysis OR test to assess the risk of independent variables on the dependent variable. Multivariate analysis was also performed to see the relationship between the variables of coronary atherosclerosis early age with all the variables studied so unknown independent variables were the most dominant influence on coronary atherosclerosis early age by using multiple logistic regressions.

RESULTS

Characteristics of Respondents

Results of the analysis illustrates distribution of respondents based on demographic characteristics of respondents (age, gender, and occupation). General characteristics of sample according to the age of respondents in this study were divided into three age groups. Most age groups suffer coronary atherosclerosis is at age of 40-49 years age group to 34 people (46.6%), whereas in the control group who did not have coronary atherosclerosis early age it was found that the age group 50-57 years is 37 people (50.7%) (Table 1).

Table 1. Distribution of respondents based on their characteristics in Dr. Wahidin Sudirohusodo hospital, 2014

Characteristics	Cases		Control		Total	
	n	%	n	%	n	%
Age						
30-39	6	8.2	7	9.6	13	8.9
40-49	34	46.6	29	39.7	63	43.2
50-57	33	45.2	37	50.7	70	47.9
Sex						
Male	59	80.8	59	80.8	118	80.8
Female	14	19.2	14	19.2	28	19.2
Occupation						
Private employee	25	34.2	20	27.4	45	30.8
Civil servant	29	39.7	15	20.5	44	30.1
Labor	4	5.5	13	17.8	9	11.6
Farmer / sailor	4	5.5	5	6.8	9	6.2
Business	2	2.7	12	16.4	14	9.6
Jobless	9	12.3	8	11.0	17	11.6

Characteristics of respondents by sex both male and female have the same proportion of cases and controls with 59 male (80.8%) and female 14 (19.2%) and it was obtained information that more the male gender suffer from coronary atherosclerosis early age than female gender (Table.1). Characteristics of respondents by occupation on the incidence of coronary atherosclerosis early age showed that the type of work most highest in the group of cases suffering from coronary atherosclerosis is the early age of civil servants is 29 people (39.7%), whereas in the control group who did not have coronary atherosclerosis early age most are private employees of 20 persons (27.4%).

Risk Analysis

The analysis shows the status of obesity is not a risk factor for atherosclerotic events early age OR = 0.74 (95% CI = 0:37 to 1:46) and hypertension are risk factors for the incidence of coronary atherosclerosis early age with OR = 2.19 (95% CI = 1:10 to 4:36) where hypertension status at risk for coronary atherosclerosis early age 2:19 times higher than non-hypertensive (Table 2).

Table 2. Obesity risks and Hypertension base on sex to the early age Atherosclerosis occurrence in Dr. Wahidin Sudirohusodo Hospital, 2014

Variable	Cases		Control		Total		OR
	n	%	n	%	n	%	95% CI
Obesity Status							
Obesity	23	45.1	28	54.9	51	100	0.74
Not Obesity	50	52.6	45	47.4	95	100	(0.34-1.45)
Hypertension Status							
Hypertension	33	62.3	20	37.7	53	100	2.19
Not Hypertension	40	43.0	53	57.0	93	100	(1.10-4.36)

Results of the analysis of lipids comprising the total cholesterol, LDL cholesterol, HDL cholesterol at early age with the incidence of atherosclerosis indicate values obtained for total cholesterol OR = 1:08 (95% CI = 0:50 to 2:30), LDL cholesterol value of OR = 0.68 (95% CI = 0:34 to 1:38), HDL cholesterol value of OR = 5.09 (95% CI = 2:15 to 10:30). The results for the interpretation of the status of lipid levels with the incidence of atherosclerosis early age only low HDL cholesterol levels indicate risk of disease atherosclerosis coroner early age with 5:09 times higher risk than those who do not have low HDL cholesterol to total cholesterol while LDL is not a incidence of atherosclerosis risk factors early age (Table 3).

Variabel Penelitian	Cases		Control		Total		OR
	n	%	n	%	n	%	95% CI
Total Cholesterol							
High	18	51.4	17	48.6	35	100	1.08
Low	55	49.5	56	50.5	111	100	(0.50-2.30)
LDL Cholesterol							
High	20	43.5	26	56.5	46	100	0.68
Low	53	53.0	47	47.0	100	100	(0.33-1.38)
HDL Cholesterol							
High	53	67.9	25	32.1	78	100	5.09
Low	20	29.4	48	70.6	68	100	(2.51-10.30)
Variable	Cases		Control		Total		OR
	n	%	n	%	n	%	95% CI
Total Cholesterol							
High	18	51.4	17	48.6	35	100	1.08
Low	55	49.5	56	50.5	111	100	(0.50-2.30)
LDL Cholesterol							
High	20	43.5	26	56.5	46	100	0.68
Low	53	53.0	47	47.0	100	100	(0.33-1.38)
HDL Cholesterol							
High	53	67.9	25	32.1	78	100	5.09
Low	20	29.4	48	70.6	68	100	(2.51-10.30)

Multivariate Analysis

Based on multivariate analysis using multiple logistic regression, variable low HDL cholesterol is the most influential determinant of the incidence of atherosclerosis early age with OR = 6.70 (95% CI = 2.96 - 12.90), Table 4.

Table 4. Result of Multivariate analysis of the risks factor of atherosclerosis incidence at early age in. Dr. Wahidin Sudirohusodo Hospital, 2014

Variable	B	S.E	Wald	Df	Sig	Exp (B)	95% CI	
							Lower	Upper
Status Hypertension	1.08	0.40	7.34	1	0.07	2.96	1.35	6.49
Cholesterol HDL	1.80	0.38	21.95	1	0.00	6.07	2.85	12.90

DISCUSSION

Results of this study indicate the status of obesity more in the control group or who do not suffer from coronary atherosclerosis at early age is 54.9% compared with the group of cases suffering from premature coronary atherosclerosis that is 45.1% and the obtained values of 0.74 OR (95% CI = 0:37 to 1:46) this means that the status of obesity is not a risk factor for incident coronary atherosclerosis early age. The results are consistent with research conducted by Supriyono, (2008) which examined the risk factors of obesity on the incidence of coronary heart disease at an early age is <45 years where his research shows obesity is not a risk factor OR of 0.8 (95% CI = 0.4- 1.6). However, different results studies is shown by Wormser (2011) whose studies meta-analysis involving 58 prospective studies showed an association between Body Mass Index (BMI) with the incidence of Coronary Heart Disease (CHD), and Cardiovascular Disease (CVD). The results of different studies can be due to differences in place and demographic factors as well as from the study. In this study, obesity by itself a risk factor is not a risk factor for coronary atherosclerosis at an early age, but obesity remains a risk factor for the occurrence of coronary atherosclerosis concurrently with the person's age. Hypertension is a condition without symptoms where abnormally high pressure in the arteries that lead to increased risk of other diseases such as stroke, diabetes and heart disease. Hypertension accelerates atherosclerosis due to high blood pressure and settling will cause direct injury to the walls of coronary arteries thus facilitating the occurrence of coronary atherosclerosis (Torry, 2012).

The results of the risk analysis on the incidence of hypertension ateroskelrosis early age showed OR of 2,186 (95% CI = 1,096 - 4:36) so that it can be said that a person with hypertension status at risk for coronary atherosclerosis early age 2,186 times higher than those who do not suffer hypertension. The research findings are also consistent with research conducted Salima (2009) which examined the risk factors for coronary heart disease in Dr Wahidin Sudirohusodo also found that individuals with hypertension have a risk of 6:27 times higher occurrence of coronary heart disease compared to people who are not hypertensive. The mechanism by which hypertension lead to paralysis or death directly related to its effect on the heart and blood vessels. The increase in systemic blood pressure increase resistance to pumping of blood from the left ventricle that increases the heart's workload. As a result, ventricular hypertrophy to increase the strength of contraction. However, the ability of the

ventricle to maintain cardiac output with compensated hypertrophy and dilation eventually exceeded and heart trouble. Heart increasingly threatened by the severity of coronary atherosclerosis. If the process continues coronary atherosclerosis, myocardial oxygen supply is reduced. The increase in myocardial oxygen demand caused by ventricular hypertrophy and increased cardiac work that would eventually lead to angina or myocardial infarction (Price, 2005).

Cholesterol, fat, and other substances can cause thickening of the arteries, so that the lumen of the blood vessels constrict and the process is called atherosclerosis. The results of this study showed only low HDL cholesterol showed the risk of coronary disease atherosclerosis early age where low HDL cholesterol levels at risk of suffering from coronary atherosclerosis early age 5.088 times higher than in people who do not have low HDL cholesterol to total cholesterol while, and LDL cholesterol was not a risk factor for incident coronary atherosclerosis early age. The ideal number for HDL cholesterol at least not less than 40 mg / dL however, this number can vary for men and women. HDL cholesterol (high-density lipoprotein), is a type of cholesterol that carries bad cholesterol (LDL cholesterol), cleans and transports fat from the arteries and back to the liver. HDL cholesterol also removes excess cholesterol from plaque, prevent settles cholesterol in the arteries and protects blood vessels from atherosclerosis (plaque formation in the blood vessel walls), (Gulfianti, 2012)

Results are in line with research conducted by NHANES (National Health and Nutrition Examination Survey) in the United States from 2005 to 2008 showed Levels of HDL cholesterol below 40 mg / dL in men and below 50 mg / dL in adult women is a factor risk for heart disease and stroke (American Heart Association, 2012). The results of another study conducted by Supriyono (2008) showed inconsistent results, where coronary heart disease risk factors early age <45 years showed an increase in total cholesterol and triglycerides are risk factors for heart disease early age and HDL and LDL cholesterol is not a risk factor early age of heart disease. The results of this study may be due to differences in different places, demographic factors as well as subject-making, especially in the control group.

CONCLUSIONS AND RECOMMENDATIONS

Obesity is not a risk factor for incident coronary atherosclerosis early age, hypertension status has 2,186 times the risk compared with those not on the incidence of hypertension and atherosclerosis early age to lipid low HDL cholesterol had 5,088 times the risk compared with those not having low HDL levels on the incidence of atherosclerosis early age, while the increase in total cholesterol and LDL cholesterol is not a risk of incident coronary atherosclerosis factor early age. This study suggests that the need for education to each patient's particular affected coronary atherosclerosis early age about the importance of primary prevention and secondary prevention, especially hypertension and diabetes mellitus, and the need to perform a health behavior, especially for respondents who are not affected by atherosclerotic disease early age in order to control the risk factors the disease so as to prevent future cardiovascular disease including controlling blood pressure, blood glucose levels, HDL cholesterol within normal limits and avoiding smoking. Research can also be used as an advanced research primarily related research on the incidence of atherosclerosis early age, especially in the younger age group (<55 years) primarily for risk factors not examined in this study.

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